

Atrial fibrillation: drug treatment and electric cardioversion

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Anticoagulant therapy (See related EBM Guideline: Indications and contraindications for anticoagulation in atrial fibrillation available on the EBM Web site).

Principles

- In acute atrial fibrillation (AF), a beta-blocker is used to control the heart rate in preparation for electric cardioversion.
- In chronic atrial fibrillation, or during the time period before an elective cardioversion, digoxin, a beta-blocker, verapamil or diltiazem may be used: a ventricular rate of 60 - 100 bpm should be reached. Do not give calcium channel blockers if the patient has cardiac insufficiency.
- The indications for, and timing of, electric cardioversion must be considered carefully.
- Acute AF (duration less than two days) can be treated with i.v. or oral flecainide if the patient does not have cardiac insufficiency, hypotension or bradycardia and has not taken other drugs that block either the function of the sinus node or atrioventricular conduction.
- Electric cardioversion is always indicated if the situation is urgent, if the patient has Wolff-Parkinson-White-syndrome, or is on medication that modifies the conduction system of the heart.

Digitalisation

- The patient with heart failure and acute AF is primarily digitalized, if electric cardioversion has not been planned, if the ventricular rate is > 80 - 100 beats/min, and if the patient has not used digitalis or has severe heart failure.
- Digitalisation either intravenously or orally:
 - Initially, a slow **intravenous** injection of 0.25 mg digoxin. A dose of 0.125 mg is given at one-hour intervals, until the total dose is maximally 0.75 mg (three 0.25-mg ampoules).
 - **In oral therapy**, maintenance doses are usually administered, but if a more rapid action is needed, a loading dose of 0.75 - 1.0 mg of digoxin can be given.

Optimising the ventricular rate

- A rapid ventricular rate must be slowed down to attain an appropriate heart rate. A ventricular rate of 60 - 90 bpm is appropriate for most patients.
- **The ventricular rate can be slowed down** with an intravenous beta-blocker (e.g. metoprolol 5 mg, repeated twice at 10-min intervals, short-acting esmolol, or 5 mg of verapamil). If slowing the rate is not urgent, the drugs can be given orally (atenolol or metoprolol 25 - 50 mg x 1, or verapamil 40 mg x 3).
- In a patient with cardiac insufficiency, verapamil and diltiazem may worsen the situation, in which case an effective dose of digoxin is given. A beta-blocker can be used in small doses while carefully observing the response.
- **If the ventricular response rate is slow and the patient has symptoms**, reduce the doses of drugs that have negative chronotropic action, or stop the medication completely. If the patient continued to have bradycardia and symptoms, implanting a pacemaker should be considered.
- Digitalis optimises the ventricular response rate during rest, and often digitalisation is all that is needed in elderly patients. During exercise, however, the ventricular response rate can increase rapidly, impairing exercise capacity. To prevent this, younger patients may need, instead of digitalis, a beta-blocker or a calcium channel blocker that decreases the heart rate.
- An increase in ventricular response rate in AF may be a sign of aggravated heart failure. In this case merely slowing down the ventricular response rate is not sufficient.

Restoration of sinus rhythm

- Measures to convert AF to sinus rhythm should be undertaken if the sinus rhythm has not been restored after the reduction of heart rate and correction of possible heart failure (Level of Evidence=B; Evidence Summary available on the EBM Web site).
- **Electric cardioversion** is recommended if the patient
 - has used several antiarrhythmic drugs
 - is hypotensive
 - is in a critical condition because of the arrhythmia
 - has chronic AF.
- Drugs used in this indication include flecainide and propafenone; previously, quinidine 0.2 g 3 times at 2-hour intervals was often used. Monitoring the patient during the conversion of the rhythm, and for at least 3 hours after it, is recommended because of the risk of ventricular tachycardia.

Conversion of the rhythm with flecainide

- Note the following contraindications

- Dysfunction of the sinus node: acute AF with ventricular rate < 80 bpm when the patient has not taken any medication that slows the ventricular response rate.
- Second- or third-degree AV block
- Severe cardiac insufficiency
- Use of a class I antiarrhythmic drug, sotalol more than 160 mg/day, or less than 8 hours since the ingestion of the last sotalol tablet. If the patient is not in a hospital with special care facilities, it may be advisable not to use flecainide in patients on sotalol or some other antiarrhythmic medication.
- Mix flecainide in 100 mL of 5% glucose. The dose is 2 mg/kg, maximally 150 mg as an infusion over 30 minutes. Discontinue the infusion if the sinus rhythm is restored.
- Monitor the patient for at least one hour after the restoration of the sinus rhythm; after that the patient is allowed to stand up. The patient may not leave the premises during the first three hours after restoration of the rhythm.
- If sinus rhythm has not been restored in three hours, perform electric cardioversion.

Treatment of atrial flutter

- Electric cardioversion is the optimal treatment.
- Verapamil and digoxin slow the ventricular response rate.
- With sufficient digitalisation, the rhythm usually reverts to fibrillation, which is better tolerated than an atrial flutter.
- I.v. ibutilide restores sinus rhythm in 60% of patients who have had AF or flutter for less than 30 days. The patient should be monitored for a few hours because of the risk of proarrhythmia (about 2%).

Maintenance of sinus rhythm

- **Digoxin** does not prevent the recurrence of AF. However, in heart failure digoxin prevents the recurrence of supraventricular arrhythmia.
- Sodium channel blockers (**quinidine, disopyramide, flecainide and propafenone**) must not be used if the left ventricular ejection fraction is below 40%, e.g. after myocardial infarction, because they worsen the arrhythmia. If therapy with sodium channel blockers is initiated, left ventricular function must be estimated. The therapy should be initiated in a hospital, unless arrhythmia is the only cardiac problem the patient has.
- Metoprolol (Level of Evidence=B; Evidence Summary available on the EBM Web site), bisoprolol and sotalol prevent recurrence of AF, and are especially suitable for patients with ischaemic heart disease or high blood pressure. Mild, compensated heart failure is not a contraindication for beta blockers. However, sotalol does not decrease (and may even increase) long-term mortality (Level of Evidence=C; Evidence Summary available on the EBM Web site).
- Beta-blockers are suitable for the prevention of arrhythmias associated with physical exercise.
- **Flecainide** (Level of Evidence=C; Evidence Summary available on the EBM Web site), **propafenone** (Level of Evidence=A; Evidence Summary available on the EBM Web site) and **amiodarone** (Level of Evidence=C; Evidence Summary available on the EBM Web site) are effective in preventing atrial fibrillation, but the therapy should be initiated only after consultation of a specialist in internal medicine or cardiology. They are often combined with a selective beta-blocker. Amiodarone is also used as a short-course prophylactic medication in association with surgical procedures.

Anticoagulant therapy after conversion

- **Anticoagulation** is usually continued for 4 weeks after the conversion of the rhythm. Embolic risk is high after restoration of sinus rhythm, e.g. in patients with hyperthyroidism. The mechanical function of the atria begins slowly, and formation of thrombi may continue even during electrical sinus rhythm. Continuation of anticoagulation also offers the possibility of repeating electric cardioversion during the follow-up visit, if the fibrillation has recurred. This is possible in patients who have not started a prophylactic medication after the first electric cardioversion.
- See article on Indications and contraindications of anticoagulant therapy (See related EBM Guideline: **Indications and contraindications for anticoagulation in atrial fibrillation** available on the EBM Web site).

Staging the treatment

- Prophylaxis of AF with antiarrhythmic drugs requires knowledge of cardiology, as sodium channel blockers (e.g. quinidine, disopyramide, flecainide, propafenone) may be a greater risk to the cardiac patient than AF as such.

Related evidence

- Low-dose amiodarone (mean amiodarone dose per day ranged from 152 - 330 mg) has thyroid, neurologic, dermatologic, ocular, and bradycardic adverse effects (Level of Evidence=A; Evidence Summary available on the EBM Web site).

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